

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: **Craddock et al.**Serial No.: **09/895,233**Filed: **June 29, 2001**For: **End Node Partitioning Using
Local Identifiers****35525**PATENT TRADEMARK OFFICE
CUSTOMER NUMBER§
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§Group Art Unit: **2145**Examiner: **Swearingen, Jeffrey R.**Attorney Docket No.: **AUS920010492US1**Certificate of Transmission Under 37 C.F.R. § 1.8(a)

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By:


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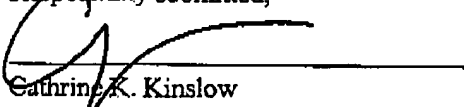
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Docket No. AUS920010492US1

PATENT

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Serial No. 09/895,233

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For: End Node Partitioning Using
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By:


Lourdes Perez

APPEAL BRIEF (37 C.F.R. 41.37)

This brief is in furtherance of the Notice of Appeal, filed in this case on June 9, 2005.

The fees required under § 41.20(B)(2), and any required petition for extension of time for filing this brief and fees therefore, are dealt with in the accompanying TRANSMITTAL OF APPEAL BRIEF.

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REAL PARTY IN INTEREST

The real party in interest in this appeal is the following party: International Business Machines Corporation.

RELATED APPEALS AND INTERFERENCES

With respect to other appeals or interferences that will directly affect, or be directly affected by, or have a bearing on the Board's decision in the pending appeal, there are no such appeals or interferences.

STATUS OF CLAIMS

A. TOTAL NUMBER OF CLAIMS IN APPLICATION

Claims in the application are: 1-9, 13-15, and 17-30

B. STATUS OF ALL THE CLAIMS IN APPLICATION

1. Claims canceled: 10-12 and 16
2. Claims withdrawn from consideration but not canceled: NONE
3. Claims pending: 1-9, 13-15, and 17-30
4. Claims allowed: NONE
5. Claims rejected: 1-9, 13-15, and 17-30
6. Claims objected to: NONE

C. CLAIMS ON APPEAL

The claims on appeal are: 1-9, 13-15, and 17-30

STATUS OF AMENDMENTS

There are no amendments after final rejection.

SUMMARY OF CLAIMED SUBJECT MATTER**A. CLAIMS 1, 13, and 22 - INDEPENDENT**

The present invention provides a method for end node partitioning for a physical element, comprising the steps of: selecting a configuration of the physical element, said physical element including a plurality of ports (Specification, page 23, lines 6, to page 24, line 2); probing one of said plurality of ports that is included within said physical element, wherein the port is probed with a subnet management packet by a subnet manager (Specification, page 29, lines 19-22); in response to determining that said physical element is a particular type of physical element (Specification, page 29, lines 22-23), partitioning said physical element to provide a plurality of virtual representations of said physical element, each one of said plurality of virtual representations having a unique access control level (Specification, page 29, line 29, to page 30, line 16); and partitioning said physical element by assigning a different local identifier to each one of said plurality of ports that is included within said physical element resulting in a configuration change of the physical element (Specification, page 29, line 29, to page 30, line 16). These features are recited in independent claims 1, 13, and 22 of the present invention.

GROUND OF REJECTION TO BE REVIEWED ON APPEAL

A. GROUND OF REJECTION

The grounds of rejection to be reviewed on appeal are:

I. Claims 1, 5, 8, 9, 13, 17 and 20-22 are rejected as being allegedly unpatentable over Shah et al. (U.S. Patent No. 6,694,361) under 35 U.S.C. §102(c).

II. Claims 2-4, 6-7, 14-15, 18-19, and 23-30 are rejected as being allegedly unpatentable over Shah et al. (U.S. Patent No. 6,694,361) in view of Bakke et al. (U.S. Patent No. 6,704,812) under 35 U.S.C. §103(a).

ARGUMENT

I. 35 U.S.C. § 102, Anticipation, Claims 1, 5, 8, 9, 13, 17 and 20-22

Claims 1, 5, 8, 9, 13, 17 and 20-22 are rejected under 35 U.S.C. § 102(e) as being unpatentable over *Shah et al.* This rejection is respectfully traversed.

With regard to claims 1, 13, and 22, the Examiner states:

Shah discloses a *method [and system and computer program product in a computer readable medium] for end node partitioning for a physical element, comprising the steps of:*

- a. *Selecting a configuration of the physical element, said physical element including a plurality of ports; [Shah discloses host-fabric adapter initialization and configuration and channel configuration. Shah, column 5, lines 48-50. Channel configuration would inherently involve channel adapters in the Shah invention. Shah discloses that channel adapters contain one or more subnet attachment points called ports. Shah, column 7, lines 43-45. Furthermore, the Examiner considers that any host-fabric adapter configuration would inherently contain a plurality of ports because a connection between a host and the switching fabric is often a port.]*
- b. *Probing one of said plurality of ports that is included within said physical element, wherein the port is probed with a subnet management packet by a subnet manager; [Shah, column 7, lines 27-34. Shah, column 8, lines 33-51. Shah discloses management of ports on channel adapters by the subnet manager. While Shah does not explicitly state probing the port with a subnet management packet, this function is considered well within the realm of port management by a subnet manager.]*
- c. *In response to determining that said physical element is a particular type of physical element, partitioning said physical element to provide a plurality of virtual representations of said physical element, each one of said plurality of virtual representations having a unique access control level; [Shah discloses assigning multiple paths to a port. [Shah, column 8, lines 52-67. Each path can provide different service levels. The Examiner places little weight on the word virtual since virtual can mean created by a computer and or computer network, according to *The American Heritage College Dictionary*, fourth edition.] and*
- d. *Partitioning said physical element by assigning a different local identifier to each one of said plurality of ports that is included within said physical element resulting in a configuration change of the physical element. [Shah, column 8, lines 37-56. Transitioning the ports through different states is a configuration change of the physical element.]*

(Final Office Action dated March 7, 2005, pages 2-3).

A prior art reference anticipates the claimed invention under 35 U.S.C. § 102 only if every element of a claimed invention is identically shown in that single reference, arranged as they are in the claims. *In re Bond*, 910 F.2d 831, 832, 15 U.S.P.Q.2d 1566, 1567 (Fed. Cir. 1990). In this case each and every feature of the presently claimed invention is not identically shown in *Shah*, arranged as they are in the claims. Independent claim 1, which is representative of independent claims 13 and 22, reads as follows:

1. A method for end node partitioning for a physical element, comprising the steps of:

selecting a configuration of the physical element, said physical element including a plurality of ports;

probing one of said plurality of ports that is included within said physical element, wherein the port is probed with a subnet management packet by a subnet manager;

in response to determining that said physical element is a particular type of physical element, partitioning said physical element to provide a plurality of virtual representations of said physical element, each one of said plurality of virtual representations having a unique access control level; and

partitioning said physical element by assigning a different local identifier to each one of said plurality of ports that is included within said physical element resulting in a configuration change of the physical element. (Emphasis added)

Claim 1 recites the features of "partitioning said physical element to provide a plurality of virtual representations of said physical element, each one of said plurality of virtual representations having a unique access control level." The Examiner cites the following section of *Shah* as teaching these features:

A fabric-attached port can be assigned multiple LIDs [local identification values] as per the InfiniBand specification. Each LID for a port specifies a different path to that port from some other port on the fabric.

To program a different LID for each path to a port, the subnet manager has to identify every single path to this port from every other port on the fabric. It has to repeat the procedure for every single port on the fabric. For analyzing paths between two ports, a separate analysis has to be done in each direction. This is because a path from port A to port B traversing a set of switches and links is not necessarily identical to the reverse path from port B to port A using the exact same set of switches and links. The same set of links and switches may support different service levels in each direction and these are path attributes that need to be analyzed by the subnet manager in each direction.

Shah, column 8, lines 52-67.

In the section cited above, *Shah* teaches assigning different LIDs to each path to a port. Merely assigning a LID to each port does not teach partitioning a physical element to provide of virtual representations of the physical element, each one of the virtual representations having a unique access control level. The Examiner alleges that *Shah* teaches partitioning to provide virtual representations of a physical element by disclosing "assigning multiple paths to a port." However, a different path to a port is not a virtual representation of a physical element. The Examiner has disregarded the phrase "virtual representation" in the claims, stating that he placed "little weight on the word virtual since virtual can mean created by a computer and or computer network, according to *The American Heritage College Dictionary*, fourth edition."

The Examiner has missed a critical point regarding the concept of virtual due to the use of a non-technical dictionary. *The Foldoc Free On-Line Dictionary of Computing* defines virtual as a "[c]ommon alternative to logical; often used to refer to the artificial objects (like addressable virtual memory larger than physical memory) created by a computer system to help the system control access to shared resources." Computers often employ virtual representations of physical elements to achieve advantageous goals, such as helping a system control access to shared resources. From 1976 to the present, the inventors of more than 2,900 inventions have believed that the concept of "virtual" was important enough to include the word "virtual" in the title of applications for patents that were approved by the United States Patent and Trademark Office. More than 2,300 of these 2,900 inventions explicitly use the word "virtual" in their claims.

Unlike the Examiner, *Shah* does not place little weight on the word virtual, as *Shah* uses the word virtual repeatedly to discuss important concepts in detail:

Virtual Interface (VI) architecture in compliance with the "Virtual Interface (VI) Architecture Specification, Version 1.0," as set forth by Compaq Corp., Intel Corp., and Microsoft Corp., on Dec. 16, 1997. NGIO and VI architectures support asynchronous data transfers between two memory regions, typically on different systems over one or more designated channels of a data network. Each system using a VI architecture may contain work queues formed in pairs including a send queue and a receive queue in which requests, in the form of descriptors, are posted to describe data movement operation and location of data to be moved for processing and/or transportation via a NGIO switched fabric. The VI Specification defines VI mechanisms for low-latency, high-bandwidth message-passing between interconnected nodes connected by multiple logical point-to-point channels. Other architectures such as InfiniBand may also be used to implement the present invention.

In such a data network, NGIO, VI and InfiniBand hardware and software may be used to support asynchronous data transfers between two memory regions, often on different systems.

Shah, column 6, lines 26- 28.

The citation to column 8, lines 52-67, in *Shah*, listed above, that the Examiner used to allege that *Shah* teaches the features of “partitioning said physical element to provide a plurality of virtual representations of said physical element, each one of said plurality of virtual representations having a unique access control level,” is only the first half of the paragraph. The second half of the paragraph uses the word “virtual” to describe an important concept:

At a minimum, path analysis involves detecting physical connectivity, analyzing service levels for each path, analyzing maximum transfer unit size for each path and programming of switch forwarding tables. It may also involve calculating latency costs for the path and programming service level to virtual lane mapping tables in switches. In an example disadvantageous arrangement, a simple subnet manager may perform a complete path analysis before assigning LIDs to ports. Once it completes path analysis, the subnet manager may assign LIDs in sequential order, with no gaps between the LIDs assigned to different ports. There are several problems with this approach.

While *Shah* used the word “virtual” to qualify “lane mapping tables in switches,” *Shah* never used the word “virtual” to qualify “path” because a different path to a port is not a virtual representation of a physical element. To the contrary, *Shah* explicitly defines path analysis as detecting “physical connectivity,” and physical connectivity is, by the Examiner’s definition, absent in a virtual representation of a physical element. Therefore, *Shah* does not teach providing virtual representations of a physical element.

The Examiner also adds that “[e]ach path can provide different service levels.” But a service level is not a unique access control level. *Shah* mentions “service level” only in the full paragraph from *Shah* discussed above, the first half cited by the Examiner and the second half also cited above in reference to virtual lane mapping tables in switches. Although *Shah* does not define “service level” explicitly, the use of the phrase in *Shah* makes evident that “service level” is not a unique access control level. In *Shah*, the “same set of links and switches may support different service levels in each direction and these are path attributes that need to be analyzed by the subnet manager in each direction,” which indicates that a service level may not permit a transfer to occur in both directions on a path, but such a service level, serving as a virtual one-

way sign for traffic, is not an access control level, much less a *unique* access control level. (*Shah*, column 8, lines 64-68). The only other mention of a service level in *Shah* supports this conclusion: "path analysis involves detecting physical connectivity, analyzing service levels for each path, analyzing maximum transfer unit size for each path and programming of switch forwarding tables. It may also involve calculating latency costs for the path and programming service level to virtual lane mapping tables in switches." (*Shah*, column 9, lines 1-6) Therefore, *Shah* does not teach each one of the virtual representations having a unique access control level.

Furthermore, the rejection of the independent claims is a 102(e) rejection. However, the Examiner admits that *Shah* does not teach every element of the claims: "While *Shah* does not explicitly teach probing the port with a subnet management packet, this function is considered well within the realm of port management by a subnet manager." But a prior art reference anticipates the claimed invention under 35 U.S.C. § 102 only if every element of a claimed invention is identically shown in that single reference, arranged as they are in the claims. *In re Bond*, 910 F.2d 831, 832, 15 U.S.P.Q.2d 1566, 1567 (Fed. Cir. 1990). *Shah* does not show the claim element of "probing the port with a subnet management packet," *Shah* does not anticipate the present invention under 35 U.S.C. § 102.

Because *Shah* does not teach partitioning a physical element, providing a plurality of virtual representations, each virtual representation of the physical element having a unique access control level, or even probing the port with a subnet management packet, *Shah* does not anticipate Appellants' claims.

In view of the above, Appellants submit that independent claims 1, 13, and 22 are not taught or suggested by *Shah*. Claims 5, 8-9, 17, and 20-21 are dependent claims depending from independent claims 1 and 13, respectively. These dependent claims are also allowable, at least by virtue of their dependency on an allowable claim.

Therefore, the rejection of claims 1, 5, 8-9, 13, 17, and 20-22 under 35 U.S.C. § 102 has been overcome.

II. 35 U.S.C. § 103, Obviousness, Claims 2-4, 6-7, 14-15, 18-19, and 23-30

Claims 2-4, 6-7, 14-16, 18-19, and 23-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Shah* in view of U.S. Patent 6,704,812 issued to *Bakke*. This rejection is respectfully traversed for at least the same reasons as set forth above with regard to independent

claims 1, 13 and 22 from which these claims depend. That is, *Shah* does not teach or suggest partitioning a physical element to provide virtual representations of the physical element, each one of the virtual representations having a unique access control level. *Bakke* also does not teach or suggest this feature. The Examiner relies upon *Shah* to teach partitioning a physical element to provide virtual representations of the physical element, each one of the virtual representations having a unique access control level, because *Bakke* never even mentions partitions, partitioning, physical elements, virtual, levels, or unique access control levels.

Even if, for the sake of argument, *Shah* taught partitioning a physical element to provide virtual representations of the physical element, each one of the virtual representations having a unique access control level, as alleged by the Examiner, one of ordinary skill in the art would not combine *Shah* with *Bakke* when each reference is considered as a whole. In considering the references as a whole, one of ordinary skill in the art would take into account the problems recognized and solved. For example, *Bakke* is directed towards a redundancy manager to manage commands to peripheral devices in a computer system:

These peripheral devices have multiple ports and may have a different bus associated with each port. The buses, referred to as independent pathways, moreover, need not have the same protocol. The redundancy manager determines the number of independent pathways connected to the peripheral device, presents only one logical device to the operating system and any device driver and any other command or device processing logic in the command path before the redundancy manager. For each incoming command, the redundancy manager determines which pathways are properly functioning and selects the best pathway for the command based on load balancing considerations and any ordering semantics that must be preserved in the incoming command and any outstanding commands and associated data that have not yet executed. The redundancy manager further reroutes the command to an alternate path and resets the device for the alternate path if the selected path failed. Thus, a dynamic mechanism and method to manage multiple pathways to I/O devices such as storage disks do not require the intervention of either the operating system of the computer or any device driver associated with the device or the interconnecting bus.

Bakke, Abstract.

Bakke teaches load balancing amongst redundant physical paths, the use of alternate paths when a physical path has failed, and recovering use of a failed path once it becomes available, without the intervention of either the operating system of the computer or any device driver. Therefore, *Bakke* is directed towards managing multiple physical paths from a host computer

system to peripheral devices.

In contrast, *Shah* is directed towards assigning multiple local identification values (LIDs) to ports in a data network, or cluster:

A cluster includes a fabric, a host coupled to the fabric, an I/O enclosure coupled to the fabric, and a subnet manager. The subnet manager performs a topology discovery of the cluster and detects ports associated with the fabric. The subnet manager computes a minimal spanning tree for the cluster, which connects every port to every other port through a single path. The subnet manager assigns a single base LID to each port and programs the assigned LIDs into forwarding tables in the fabric. Additional LIDs are reserved for each port while the single base LID is assigned to each port such that the fabric is functional and connected when the subnet manager is performing a path analysis of the cluster.

Shah, Abstract.

Thus, *Shah* teaches assigning multiple LIDs to ports in a data network so that additional LIDs are reserved for each port when new resources and devices are incorporated into the data network, and *Bakke* teaches managing multiple physical paths from a host computer system to peripheral devices. *Shah* is directed towards assigning values in a data network while *Bakke* is directed towards managing physical paths to peripheral devices. Therefore, one of ordinary skill in the art would not attempt to combine *Shah* with *Bakke*.

As the Examiner has failed to demonstrate any motivation or incentive in the prior art to combine and modify the references so as to achieve the claimed invention, the alleged combination can only be the result of impermissible hindsight reconstruction using Appellants' own disclosure as a guide. While Appellants understand that all examination entails some measure of hindsight, when the rejection is based completely on hindsight, as in the present case, to the exclusion of what can be gleaned from the references, then the rejection is improper and should be withdrawn.

Even if *Shah* was properly combinable with *Bakke*, the result of such a combination would not be the invention as recited in claim 1 of the present invention. Rather, such an alleged combination of *Shah* with *Bakke* would still not be the invention as recited in claim 1 of the present invention. Rather, such an alleged combination would result in a system of assigning values in a data network, substantially as taught in *Shah*, in addition to the features of managing physical paths to peripheral devices, substantially as taught in *Bakke*, but not a system partitioning a physical element to provide virtual representations of the physical element, each one

of the virtual representations having a unique access control level. A system that assigned values in a data network would not benefit from the addition of a feature oriented towards managing physical paths to peripheral devices. Even considering *Bakke*, the cited references fail to teach or suggest partitioning a physical element to provide virtual representations of the physical element, each one of the virtual representations having a unique access control level, as recited in claim 1.

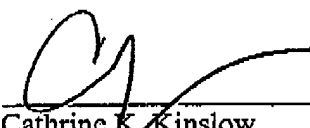
In view of the above, Appellants submit that claims 2-4, 6-7, 14-15, 18-19, and 23-30 are not taught or suggested by the alleged combination of *Bakke* and *Shah*. Claims 2-4, 6-7, 14-15, 18-19, and 23-30 are dependent claims depending from independent claims 1, 13, and 22, respectively. These dependent claims are also allowable, at least by virtue of their dependency on an allowable claim.

Therefore, the rejection of claims 2-4, 6-7, 14-15, 18-19, and 23-30 under 35 U.S.C. § 103 has been overcome.

CONCLUSION

For the reasons stated above, Appellants respectfully submit that the rejection under 35 U.S.C. §102(e) of claims 1, 5, 8, 9, 13, 17, and 20-22 has been overcome and the rejection under 35 U.S.C. §103(a) of claims 2-4, 6-7, 14-15, 18-19, and 23-30 has also been overcome. Accordingly, Appellants respectfully request that the Board of Patent Appeals and Interferences overturn the rejections set forth in the Final Office Action.

Respectfully submitted,



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CLAIMS APPENDIX

The text of the claims involved in the appeal are:

1. A method for end node partitioning for a physical element, comprising the steps of:

selecting a configuration of the physical element, said physical element including a plurality of ports;

probing one of said plurality of ports that is included within said physical element, wherein the port is probed with a subnet management packet by a subnet manager;

in response to determining that said physical element is a particular type of physical element, partitioning said physical element to provide a plurality of virtual representations of said physical element, each one of said plurality of virtual representations having a unique access control level; and

partitioning said physical element by assigning a different local identifier to each one of said plurality of ports that is included within said physical element resulting in a configuration change of the physical element.

2. The method as recited in claim 1, wherein selecting the configuration of the physical element includes a static selection of the physical element and a dynamic selection of the physical element.

3. The method as recited in claim 2, further comprising:

in response to a static selection of the physical element, modifying the configuration of the physical element through at least one of a fabric initialization and a reboot of a node associated with the port.

4. The method as recited in claim 2, further comprising:

in response to a dynamic selection of the physical element, modifying the configuration of the physical element through a reboot of a node associated with the port.

5. The method as recited in claim 1, further comprising:

said physical element being one of a switch, a target channel adapter, and a host channel adapter.

6. The method as recited in claim 1, further comprising:

in response to a host channel adapter and a host node becoming operational, reporting the host channel adapters and host processor node as they become operational.

7. The method as recited in claim 1, further comprising:

in response to removing a host channel adapter and a host node from operation, reporting the removal of the host channel adapter and the host node from operation.

8. The method as recited in claim 1, further comprising:

connecting one or more operating system images to at least one host channel adapter.

9. The method as recited in claim 8, wherein the host channel adapter is a virtual host channel adapter.

13. A system for end node partitioning for a physical element, comprising:

a selection component for selecting a configuration of the physical element, said physical element including a plurality of ports;

a probing component for probing one of said plurality of ports that is included within said physical element, wherein the port is probed with a subnet management packet by a subnet manager;

in response to determining that said physical element is a particular type of physical element, partitioning means for partitioning said physical element to provide a plurality of virtual representations of said physical element, each one of said plurality of virtual representations having a unique access control level; and

an assignment component for partitioning said physical element by assigning a different local identifier to each one of said plurality of ports that is included within said physical element resulting in a configuration change of the physical element.

14. The system as recited in claim 13, wherein selecting the configuration of the physical element includes a static selection of the physical element and a dynamic selection of the physical element.

15. The system as recited in claim 14, further comprising:

a modification component, in response to a static selection of the physical element, for modifying the configuration of the physical element through at least one of a fabric initialization and a reboot of a node associated with the port.

17. The system as recited in claim 13, further comprising:

said physical element being one of a switch, a target channel adapter, and a host channel adapter.

18. The system as recited in claim 13, further comprising:

a reporting component, in response to a host channel adapter and a host node becoming operational, for reporting the host channel adapter and host processor node as they become operational.

19. The system as recited in claim 13, further comprising:

a reporting component, in response to removing a host channel adapter and a host node from operation, reporting the removal of the host channel adapter and the host node from operation.

20. The system as recited in claim 13, further comprising:

a connection component for connecting one or more operating system images to at least one host channel adapter.

21. The system as recited in claim 20, wherein the host channel adapter is a virtual host channel adapter.

22. A computer program product in a computer readable medium for end node partitioning for a physical element, comprising:

instructions for selecting a configuration of the physical element, said physical element

including a plurality of ports;

instructions for probing one of said plurality of ports that is included within said physical element, wherein the port is probed with a subnet management packet by a subnet manager;

in response to determining that said physical element is a particular type of physical element, instructions for partitioning said physical element to provide a plurality of virtual representations of said physical element, each one of said plurality of virtual representations having a unique access control level; and

instructions for partitioning said physical element by assigning a different local identifier to each one of said plurality of ports that is included within said physical element resulting in a configuration change of the physical element.

23. The computer program product as recited in claim 22, wherein selecting the configuration of the physical element includes a static selection of the physical element and a dynamic selection of the physical element.

24. The computer program product as recited in claim 23, further comprising:

instructions, in response to a static selection of the physical element, for modifying the configuration of the physical element through at least one of a fabric initialization and a reboot of a node associated with the port.

25. The computer program product as recited in claim 23, further comprising:

instructions, in response to a dynamic selection of the physical element, for modifying the configuration of the physical element through a reboot of a node associated with the port.

26. The computer program product as recited in claim 23, further comprising:

said physical element being one of a switch, a target channel adapter, and a host channel adapter.

27. The computer program product as recited in claim 23, further comprising:

instructions, in response to a host channel adapter and a host node becoming operational, for reporting the host channel adapters and host processor node as they become operational.

28. The computer program product as recited in claim 23, further comprising:

Instructions, in response to removing a host channel adapter and a host node from operation, for reporting removal of the host channel adapter and the host node from operation.

29. The computer program product as recited in claim 23, further comprising:

Instructions for connecting one or more operating system images to at least one host channel adapter.

30. The computer program product as recited in claim 29, wherein the host channel adapter is a virtual host channel adapter.

EVIDENCE APPENDIX

There is no evidence to be presented.

RELATED PROCEEDINGS APPENDIX

There are no related proceedings.